

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently amended): A self-calibrating optical reflectance probe system comprising:

an illuminant light source for illuminating a sample material within a chamber;

optical pickup means for collecting reflected light from the sample material; ~~and~~

an articulated white reference reflection standard adapted to generate a white reference signal for calibration of the optical reflectance probe system when articulated to a position for reflecting light from the illuminant light source to the optical pickup means; ~~means.~~

a housing that encases and seals the illuminant light source, the optical pickup means, and the articulated white reference from contamination, the housing having a window through which illuminant light from the illuminant light source exits the housing and enters the chamber and through which the

reflected light from the sample material within the chamber is reflected to the
optical pickup means; and
means for mounting the housing to the chamber.

Claim 2 (Original): The self-calibrating optical reflectance probe system according to claim 1, wherein the illuminant light source comprises multiple illuminant light sources for redundancy.

Claim 3 (Original): The self-calibrating optical reflectance probe system according to claim 1, wherein the optical pickup means comprises multiple optical pickup fibers for diversity in reflected light detection.

Claim 4 (Original): The self-calibrating optical reflectance probe system according to claim 1, the probe system further comprising an optical line source adapted for wavelength calibration and verification.

Claim 5 (Original): The self-calibrating optical reflectance probe system according to claim 1, the probe system further comprising an articulated spectral reference standard for dynamic range verification.

Claim 6 (Original): The self-calibrating optical reflectance probe system according to claim 1, the probe system further comprising an articulated transmissive filter for dynamic range measurement and/or wavelength calibration and verification.

Claim 7 (Currently amended): The self-calibrating optical reflectance probe system according to claim 1, the probe system further comprising a rotatable shutter wheel having at least one aperture located so as to be selectively alignable with the optical pickup means by rotating the shutter wheel and thereby expose the optical pickup means to the reflected light, and at least one shutter located on the shutter wheel so as to be selectively alignable with the optical pickup means by rotating the shutter wheel and thereby shutter the optical pickup means from the reflected light ~~adapted~~ to generate a dark reference signal for calibration of the optical reflectance probe system. ~~system by shuttering the illuminant light source.~~

Claim 8 (Currently amended): The self-calibrating optical reflectance probe system according to claim 1, wherein the window is curved so that a reflected portion of the illuminant light that is reflected by the window

is projected back to the illuminant light source and away from the optical pickup means. ~~the probe system further comprising a window through which light passes from the illuminant light source, the window being curved to reduce reflected light from the window surface.~~

Claim 9 (Currently amended): The self-calibrating optical reflectance probe system according to claim 1, wherein the mounting means comprises a pipe fitting attached to the chamber and a clamp attaching the housing to the pipe fitting. ~~the probe system further comprising a mount employing a single sanitary pipe fitting and clamp.~~

Claim 10 (Currently amended): A self-calibrating optical reflectance probe system comprising:

an illuminant light source for illuminating a sample material within a chamber;

optical pickup means for collecting reflected light from the sample material;

an optical line source adapted for performing wavelength calibration and verification;

a first window through which illuminant light passes from the illuminant light source, the first window being curved to so that a reflected portion of the illuminant light that is reflected by the first window is projected back to the illuminant light source and away from the optical pickup means;
~~reduce reflected light from the window surface;~~

a white reference reflection standard adapted for use as an illuminant reference; ~~and~~

means for articulating the white reference standard into and out of an optical path through the probe system, wherein a white reference signal is generated for calibration of the optical reflectance probe system when the white reference standard is articulated into the optical path so as to be illuminated by the illuminant light source and reflect light to the optical pickup means; ~~means.~~

a housing that encases and seals the illuminant light source, the optical pickup means, the optical line source, the first window, the white reference reflection standard, and the articulating means; and

means for mounting the housing to and supporting the housing from the chamber, the mounting means having a second window through which illuminant light from the illuminant light source enters the chamber and through

which the reflected light from the sample material within the chamber is reflected to the optical pickup means.

Claim 11 (Original): The self-calibrating optical reflectance probe system according to claim 10, wherein the illuminant light source comprises multiple illuminant light sources for redundancy.

Claim 12 (Original): The self-calibrating optical reflectance probe system according to claim 10, wherein the optical pickup means comprises multiple optical pickup fibers for diversity in reflected light detection.

Claim 13 (Original): The self-calibrating optical reflectance probe system according to claim 10, the probe system further comprising an articulated spectral reference standard for dynamic range verification and/or wavelength calibration and verification.

Claim 14 (Original): The self-calibrating optical reflectance probe system according to claim 10, the probe system further comprising an articulated transmissive filter for dynamic range measurement and/or wavelength calibration and verification.

Claim 15 (Currently amended): The self-calibrating optical reflectance probe system according to claim 10, the probe system further comprising a rotatable shutter wheel having at least one aperture located so as to be selectively alignable with the optical pickup means by rotating the shutter wheel and thereby expose the optical pickup means to the reflected light, and at least one shutter located on the shutter wheel so as to be selectively alignable with the optical pickup means by rotating the shutter wheel and thereby shutter the optical pickup means from the reflected light ~~adapted~~ to generate a dark reference signal for calibration of the optical reflectance probe system. ~~system by shuttering the illuminant light source.~~

Claim 16 (Currently amended): The self-calibrating optical reflectance probe system according to claim 10, wherein the mounting means comprises a pipe fitting attached to the chamber and a clamp attaching the housing to the pipe fitting. ~~the probe system further comprising a mount employing a single sanitary pipe fitting and clamp.~~

Claims 17 through 20 (Canceled)